

Building a Better Battery

July 21 2009, By Caroline Barnhill



Xiangwu Zhang joined the NC State faculty in 2006.

Amid corporate restructuring plans, car czars and a waning economy, the struggling automotive industry is tasked with providing more efficient and economical options for car buyers. While foreign markets have been quick to move into hybrid and electric vehicle space, the United States has been slower to adapt.

That's where NC State comes in.

“We need technology that allows this country’s manufacturers to produce better hybrid and [electric vehicles](#) to keep up with overseas markets,” explained Dr. Xiangwu Zhang, assistant professor of textile engineering, chemistry and science in the College of Textiles at North Carolina State University.

The U.S. Department of Energy agreed, recently awarding Dr. Zhang and colleagues at NC State's Future Renewable [Electric Energy](#) Delivery and Management (FREEDM) Systems Center more than \$1 million in grant money to continue researching ways to improve the batteries that help power plug-in hybrid electric vehicles. Fellow researchers on the project include Drs. Alex Huang, the FREEDM Systems Center director, Peter S. Fedkiw and Saad A. Khan, all of the College of Engineering at NC State.

Current batteries used in hybrid and electric vehicles are large, expensive and not entirely practical for those looking for high-power vehicles, or for people driving them on longer trips.

Zhang and his team are using a technique called electrospinning to combine lithium alloy and carbon into new composite nanofiber anodes, which have the ability to produce more energy while costing less and tolerating abuse better than existing batteries. The batteries are also lighter, producing more power in a smaller package - ideal for use in vehicles.

Nanofiber anodes can be easily produced in large numbers, which could help reduce the demand for imported petroleum, decrease emissions of air pollutants and greenhouse gases, and enable the U.S. transportation industry to sustain a strong position in the global marketplace.

"This goes beyond just building a better battery," Zhang said. "We're talking about industrial innovation that will change the way of life for future generations."

Sharing Zhang's vision is a team of four NC State graduate students who developed a business plan for Zhang's research through the Jenkins MBA program's Technology Entrepreneurship Commercialization (TEC) program in the College of Management. Their business plan is

currently being put into action through the formation of a start-up company, Tec-Cel.

A mentor on the project, Al Bender, now serves as the fledgling company's CEO. The company was incorporated in May, and is currently working to raise venture capital.

Members of the student team included Jason Marlow, who received his MBA in May 2009, and engineering graduate students Richard Wolf, Jason Marlow and Marie Kerlau. All were part-time graduate students, three with full-time positions at technology companies in Research Triangle Park.

The students continue their involvement in what is now operating as a virtual company.

"The idea of creating a company and building something from scratch... is very interesting to me," said Marlow, who has a full-time position with Red Hat operations. "Going through the TEC program and learning how to analyze markets and the technologies, talking with people and figuring out what products might sell at what price - I felt that this was a holistic approach for learning how to start and run a business."

"NC State has successfully transformed its culture of innovation into a culture of entrepreneurship," added Billy Houghteling, director of NC State's Office of Technology Transfer. "Tec-Cel is just one example of how students who've receive hands-on entrepreneurial training can make a difference by leading a company through development, inception and impact.

"The number of opportunities for students to engage in entrepreneurial activities at NC State is amazing," he said. "These students are creative, eager and excited by the technological and business challenges that NC

State provides.”

Source: North Carolina State University ([news](#) : [web](#))

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